

THE CLAIMS

1. A chip-scale package for photonic devices, comprising:  
a window;  
a chip fixed on said window; and  
an enclosure formed over said chip and on said window.
2. The package of claim 1, wherein said chip is  
hermetically sealed by said window and enclosure.
3. The package of claim 2, wherein said cover is sealed to  
said window at the periphery of said window by a sealing-  
type material.
4. The package of claim 3, wherein said window has at  
least one conductive trace.
5. The package of claim 4, wherein said chip comprises a  
photonic device.
6. The package of claim 5, wherein said chip is connected  
to the at least one conductive trace.
7. The package of claim 6, further comprising a housing  
formed around said window.

8. The package of claim 7, further comprising a ferrule having at least one optical fiber, which is placed against the said window.

9. The package of claim 8, further comprising a lens formed on said window.

10. The package of claim 9, wherein said ferrule is plugged into an opening formed by said housing.

11. The package of claim 10, wherein the optical fiber is proximate to said window so that light from the fiber can go through the optical fiber and said window to photonic device, and so that light from the photonic device can go through said window and the least one optical fiber.

12. A chip-scale package for photonic devices, comprising:  
a first housing;  
a chip attached to said first housing; and  
a window attached to said first housing.

13. The package of claim 12, further comprising:  
at least one conductive trace formed on said window; and

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the at least one conductive trace is connected to said chip and to a pad.

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14. The package of claim 13, wherein said first housing and said window form a hermetically sealed volume containing said chip.

15. The package of claim 14, wherein the pad is situated externally relative to the sealed volume.

16. The package of claim 15, further comprising a second housing attached to said first housing.

17. The package of claim 16, wherein said chip has at least one photonic device.

18. The package of claim 17, further comprising a ferrule having at least one optical waveguide.

19. The package of claim 18, wherein said ferrule plugs into a portion of said second housing.

20. The package of claim 19, wherein the at least one optical waveguide becomes aligned with the at least one

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photonic device when said ferrule is plugged into the portion of said second housing.

21. The package of claim 20, further comprising a pin for holding said ferrule in a plugged-in position in the portion of said second housing.

22. The package of claim 21, wherein said window has at least one lens situated between the at least one photonic device and optical waveguide.

23. The package of claim 22, wherein the at least one optical waveguide is an optical fiber.

24. A hermetic chip-scale package comprising:  
a first housing;  
an integrated circuit mounted within said first housing;  
a window situated on said first housing; and  
wherein:  
said integrated circuit has at least one photonic device;  
and  
said first housing and window form a hermetically sealed enclosure around said integrated circuit.

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 25. The package of claim 24, wherein said window comprises at least one conductive trace connected to said integrated circuit.

26. The package of claim 25, comprising a conductor connected to the at least one conductive trace, for providing a connection external to the hermetically sealed enclosure.

27. The package of claim 26, further comprising a receptacle having said window situated at an end of said receptacle, wherein said receptacle has at least one alignment feature.

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 28. The package of claim 25, further comprising a plug having an at least one optical waveguide, wherein said plug fits into said receptacle and is aligned with the at least one alignment feature such that one end of the at least one optical waveguide is appropriately proximate to said window.

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 29. The package of claim 26, wherein the one end of the at least one optical waveguide is aligned with the at least one photonic device.

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28. The package of claim 27, further comprising at least one pin securing said plug in said receptacle.

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29. The package of claim 28, wherein the at least one photonic device is a VCSEL.

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30. The package of claim 29, wherein:  
said first housing is composed of ceramic; and  
said window is composed of quartz.

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31. A chip-scale package for electronic devices,  
comprising:  
a transparent window having at least one conductive trace  
patterned on a surface of said window;  
a semiconductor chip fixed on said window having at least  
one terminal connected to the at least one conductive  
trace;  
an enclosure surrounding said chip and affixed to said  
window; and  
a conductive path from the at least conductive trace to an  
at least one pad on an external surface of said  
enclosure.

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The package of claim 31, wherein said chip comprises a photonic device.

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The package of claim 32, wherein said window has at least one feature on the surface of said window for alignment.

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The package of claim 32, wherein the conductive path is partially embedded in said enclosure.

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The package of claim 34, wherein the conductive path is connected to a pad on the external surface of said enclosure.

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The package of claim 35, wherein said enclosure has at least one pad connected to the at least one said conductive trace on said window.

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The package of claim 36, wherein said enclosure is sealed to said window at a periphery of said window.

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The package of claim 37, wherein said enclosure is sealed to said window at the periphery of said window by a solder-type material.

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39. The package of claim 37, wherein said enclosure is sealed to said window at the periphery of said window by an adhesive-type material.

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40. The package of claim 37, wherein said chip is hermetically sealed by said window and enclosure.

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41. The package of claim 37, wherein said chip is environmentally sealed by said window and enclosure.

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42. The package of claim 40, wherein said window has at least one refractive optical element on the surface of said window.

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43. The package of claim 41, wherein said window has at least one refractive optical element on the surface of said window.

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44. The package of claim 40, wherein said window has at least one diffractive optical element on the surface of said window.

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~~45.~~ The package of claim 41, wherein said window has at least one diffractive optical element on the surface of said window.

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~~46.~~ The package of claim 33, further comprising a housing attached to said enclosure.

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~~47.~~ The package of claim 46, wherein said housing is mechanically registered to said enclosure by at least one feature on the surface of said window.

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~~48.~~ The package of claim 47, further comprising a ferrule having at least one optical waveguide.

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~~49.~~ The package of claim 48, wherein the at least one optical waveguide is proximate to said window so that light from the waveguide can pass through said window to the at least one photonic device, and so that light from the photonic device can go through said window and to the at least one optical waveguide.

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~~50.~~ The package of claim 49, wherein said window has at least one lens situated between the at least one photonic device and optical waveguide.

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51. The package of claim 50, wherein the at least one optical waveguide is an optical fiber.

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52. The package of claim 49, further comprising at least one pin securing said ferrule to said enclosure.

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53. The package of claim 32, wherein the at least one photonic device is a VCSEL.

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54. The package of claim 31, wherein said enclosure comprises ceramic.

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55. The package of claim 31, wherein said window comprises quartz.